Roscoe A. Bartlett

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Experience

Sandia National Laboratories (2001-present)
Optimization and Uncertainty Estimation Department, computational science and engineering, software development, software engineering, DOE Q clearance

R&D of numerical algorithms: Perform research and implement software for new novel algorithms for gradient-based numerical optimization of mathematical models (Ph.D. background).

Algorithm and software development: Develop many software packages as well as generic utility software (over 38,000 commits to Trilinos alone, almost double any other Trilinos developer).

Software engineering lead for Trilinos project: Oversee and manage the software engineering foundations and infrastructure for a larger computational science and engineering project (trilinos.sandia.gov).

Object-oriented software and C++ consulting: Expert in object-oriented design and expert in C++ design and programming; used as a center-wide resource in OO and C++ (see http://www.cs.sandia.gov/~rabartl/readingList.html).

Software engineering training leadership: Lead and coordinate training and mentorship of critical software skills including arranging formal multi-day classes and book reading groups.

Computer languages/software: C++ (guru), C, Python, Perl, CMake/CTest, Fortran77, Windows IDE, Linux/Unix, Emacs, MPI, and others

Project leadership: Led several projects including the 2007 Vertical Integration Milestone effort, the 2008 and 2009 SIERRA Trilinos Integration teams, and the 2009 and 2010 NEAMS WF Infrastructure sub-team.

Public speaking: Give numerous technical presentations at conferences and other venues.

University of Maryland Baltimore County (1995-1996)
Research and teaching assistant for Dr. Govind Rao

Bartlett For Congress, Frederick MD (1995-1996)
Information Systems Manager/Developer. Developed a campaign management package called *Campaign Pro* (accounting, FEC reporting, fundraising support etc.) used by incumbent U.S. congressional campaign.

Computer languages/software: Relational database design, Microsoft Access (SQL, Access Basic, Data Access Objects (DAO))

Education

Carnegie Mellon University, Pittsburgh PA (1996-2001)
Ph.D. in Chemical Engineering (August 2001). Thesis Title *Object-Oriented Methods for Successive Quadratic Programming for Large-Scale Process Optimization*

Nonlinear programming: Successive Quadratic Programming, Quadratic Programming, Linear Solvers. Theoretical analysis and practical algorithms.

Object-oriented modeling and design: Unified Modeling Language (UML), Design Patterns etc.

Computer languages/software: C++ (ANSI/ISO Standard, Standard Library(STL)), Fortran 77, Perl, Matlab, Windows, Unix/Linux, Latex

University of Maryland Baltimore County (1993-1995)
B.S. Chemical Engineering

GPA: 4.0/4.0, Summa Cum Laude

Honors: Graduated first in class, Outstanding Graduating Chemical Engineer

Frederick Community College, Frederick MD (1991-1993)
GPA: 3.955/4.0. **Honors**: Sigma Xi Award for Science and Engineering

Hood College, Frederick MD (1991-1992)
GPA: 4.0/4.0. **Classes**: Cell Biology, Genetics

Professional Awards

1. Sandia Award for Excellence for dramatically enhancing cross-organizational collaboration through tighter integration of SIERRA and Trilinos, 2010

2. Sandia Award for Excellence for SIERRA Trilinos Integration infrastructure, 2008

3. Sandia Employee Recognition Award for ASC Xyce/Charon/Algorithms Integration Team, 2007

4. Sandia Award for Excellence for expertise and leadership for Vertical Integration Milestone, 2007

5. Sandia Award for Excellence for release of MOOCHO optimization software in Trilinos 7.0, 2007

6. Sandia Certificate of Appreciation for development and release of Trilinos 7.0 solver framework, 2007

7. Sandia Employee Recognition Award Nomination for numerical software and interfaces, 2006

8. Sandia Employee Recognition Award for Trilinos Project Team, 2005

9. Sandia Employee Recognition Award Nomination for Trilinos Development Team, 2004

10. Sandia Award for Excellence for water security modeling and optimization LDRD, 2004

11. Sandia Award for Excellence for source inversion of chem-bio releases, 2004

12. Sandia Employee Recognition Award Nomination for computational algorithms for water homeland security team, 2004

13. Sandia Certificate of Appreciation for software engineering advancements in Trilinos, 2004

14. SC2004 HPC Software Challenge Award, 2004

15. R&D 100 Award for Trilinos 3.1, 2004

16. Sandia Employee Recognition Award for DAKOTA Optimization Team, 2002

Recent Publications

http://www.cs.sandia.gov/~rabartl/publications.html#_Publications

1. Bartlett, Roscoe. Teuchos C++ Memory Management Classes, Idioms, and Related Topics: The Complete Reference (A Comprehensive Strategy for Safe and Efficient Memory Management in C++ for High Performance Computing). SAND2010-2234, Sandia National Laboratories. May 2010

2. Bartlett, Roscoe. Thyra Coding and Documentation Guidelines (TCDG) Version 1.0. SAND2010-2051. Sandia National Laboratories. May 2010

3. NEAMS Waste Forms Team. Waste Forms and Systems Integrated Performance and Safety Codes System Design Specification. SAND2009-3969, Sandia National Laboratories. September 2009 (See sections 6.2, 7.5, 7.6, 7.7, 7.8, and C.3 all written by Roscoe Bartlett)

4. Bartlett, Roscoe. Mathematical and High-Level Overview of MOOCHO: The Multifunctional Object-Oriented arCHitecture for Optimization. SAND2009-3969, Sandia National Laboratories. June 2009

5. Bartlett, Roscoe. Integration Strategies for Computational Science & Engineering Software. SAND2004-3268, Second International Workshop on Software Engineering for Computational Science and Engineering, 2009

6. Bartlett, Roscoe. Teuchos::RCP Beginner's Guide (An Introduction to the Trilinos Smart Reference-Counted Pointer Class for (Almost) Automatic Dynamic Memory Management in C++). SAND2004-3268, Sandia National Laboratories, 2007 (Updated November 2008)

7. Bartlett, Roscoe, Daniel Dunlavy, and Tim Shead. SAND2008-7593, Trilinos CMake Evaluation. Sandia National Laboratories, October 2008

8. Bartlett, Roscoe. Derivation of forward and adjoint sensitivities for ODEs and DAEs, SAND2007-6699, Sandia National Laboratories. October 2007

9. Bartlett, Roscoe. Daily Integration and Testing of the Development Versions of Applications and Trilinos: A stronger foundation for enhanced collaboration in application and algorithm research and development, SAND2007-7040, Sandia National Laboratories, October 2007

10. Bartlett, Roscoe, Scott Collis, Todd Coffey, David Day, Mike Heroux, Rob Hoekstra, Russell Hooper, Roger Pawlowski, Eric Phipps, Denis Ridzal, Andy Salinger, Heidi Thornquist, and Jim Willenbring. ASC Vertical Integration Milestone. SAND2007-5839, Sandia National Laboratories, 2007

11. Bartlett, Roscoe, Bart van Bloemen Waanders, and Martin Berggeren. Hybrid Differentiation Strategies for Simulation and Analysis of Applications in C++. ACM TOMS, Vol. 35, No. 1, Article 1, July 2008

12. Bartlett, Roscoe. Thyra Linear Operators and Vectors: Overview of Interfaces and Support Software for the Development and Interoperability of Abstract Numerical Algorithms. SAND2007-5984, Sandia National Laboratories, 2007

13. Bartlett, Roscoe, and Lorenz Biegler. QPSchur: A dual, active-set, Schur-complement method for large-scale and structured convex quadratic programming. Optim Eng, vol 7, p. 5-32, 2006

14. Bartlett, Roscoe, Bart van Bloemen Waanders, and Michael Heroux. Vector Reduction/Transformation Operators, ACM Transactions on Mathematical Software. Vol. 30, No. 1, p. 62-85, 2004

Recent Presentations

http://www.cs.sandia.gov/~rabartl/publications.html#_Presentations

1. Bartlett, Roscoe. Overview Software Life-cycle and Integration Issues for CS&E R&D Software and Experiences from Trilinos (Part I). SIAM Parallel Computing Conference, Seattle, February 24, 2010

2. Bartlett, Roscoe. Overview Software Life-cycle and Integration Issues for CS&E R&D Software and Experiences from Trilinos (Part II, Integration Issues). SIAM Parallel Computing Conference, Seattle, February 24, 2010

3. Bartlett, Roscoe. Trilinos Release Improvement Issues. 2009-7555P, Trilinos Users Group Meeting 2009, Albuquerque, NM, November 5, 2009

4. Bartlett, Roscoe. Trilinos Software Engineering Status and Future Issues. 2009-7704P, Trilinos Users Group Meeting 2009, Albuquerque, NM, November 5, 2009

5. Bartlett, Roscoe. Trilinos Software Engineering Technologies and Integration Capability Area Overview. 2009-7512P, Trilinos Users Group Meeting 2009, Albuquerque, NM, November 3, 2009

6. Bartlett, Roscoe. Integration Strategies for Computational Science and Engineering Software. 2009-0655 C, Second International Workshop and Software Engineering for Computational Science & Engineering, Vancouver, Canada, May 23, 2009

7. Bartlett, Roscoe. Almost Continuous Integration for the Co-Development of Highly Integrated Applications and Third Party Libraries. 2009-1114P, Sandia Software Engineering Seminar Series, October 2008

8. Bartlett, Roscoe. Maintaining the Stability of Trilinos Dev: Stable vs. Experimental Code. 2008-7714P, Trilinos Users Group Meeting 2008, October 2008

9. Bartlett, Roscoe. APP + Trilinos Integration: Status, Opportunities, and Challenges. 2008-7716P, Trilinos Users Group Meeting 2008, October 2008

10. Bartlett, Roscoe. Trilinos Software Engineering Technologies and Integration. 2008-7718P, Trilinos Users Group Meeting 2008, October 2008

11. Bartlett, Roscoe. Teuchos Utility Classes for Safer Memory Management in C++. 2008-7717P, Trilinos Users Group Meeting 2008, October 2008

12. Bartlett, Roscoe. CMake For Trilinos Developers. 2008-7715P, Trilinos Users Group Meeting 2008, October 2008

13. Bartlett, Roscoe. CMake Trilinos? 2008-7721P, Trilinos Users Group Meeting 2008, October 2008

14. Bartlett, Roscoe. Open-Source Software for Interfacing and Support of Large-scale Embedded Nonlinear Optimization. 2008-7720C, INFORMS Annual Meeting, October 2008

15. Bartlett, Roscoe. New Teuchos Utility Classes for Safer Memory Management in C++. SAND2007-7237C, 2007 Trilinos User's Group Meeting, Sandia National Laboratories, November 2007 (Updated August 2008)

16. Bartlett, Roscoe. ModelEvaluator: Scalable, Extensible Interface Between Embedded Nonlinear Analysis Algorithms and Applications. High Performance Computing Software Week, Boston, April 3, 2008

17. Bartlett, Roscoe. Stratimikos: Unified Wrapper to Trilinos Linear Solvers and Preconditioners. High Performance Computing Software Week, Boston, April 3, 2008

18. Bartlett, Roscoe. Overview of the Vertical Integration of Trilinos Solver Algorithms in a Production Application Code. SIAM Parallel Computing Conference, Atlanta, March 13, 2008

19. Bartlett, Roscoe. Teuchos::RCP: An Introduction to the Trilinos Smart Reference-Counted Pointer Class for (Almost) Automatic Dynamic Memory Management in C++. SAND2005-4855P, Sandia National Laboratories, 2005 (Updated February 2008)

20. Bartlett, Roscoe. Embedded Sensitivities and Optimization: From Research to Applications. SAND2008-0769P, Optimization and Uncertainty Estimation Department Review, Sandia National Laboratories, January 2008 (Updated February 2008)

21. Bartlett, Roscoe. Daily Integration and Testing of the Development Versions of Applications and Trilinos: A stronger foundation for enhanced collaboration in application and algorithm research and development. SAND2007-7236C, Sandia Software Engineering Seminar Series, Sandia National Laboratories, October 2007

22. Bartlett, Roscoe. Using Thyra and Stratimikos to Build Blocked and Implicitly Composed Solver Capabilities. SAND2007-7231C, 2007 Trilinos User's Group Meeting, Sandia National Laboratories, November 2007

23. Bartlett, Roscoe. Using FY07 ASC Vertical Integration Milestone: Overview, Lessons Learned, and Next Steps. SAND2007-7401C, 2007 Trilinos User's Group Meeting, Sandia National Laboratories, November 2007